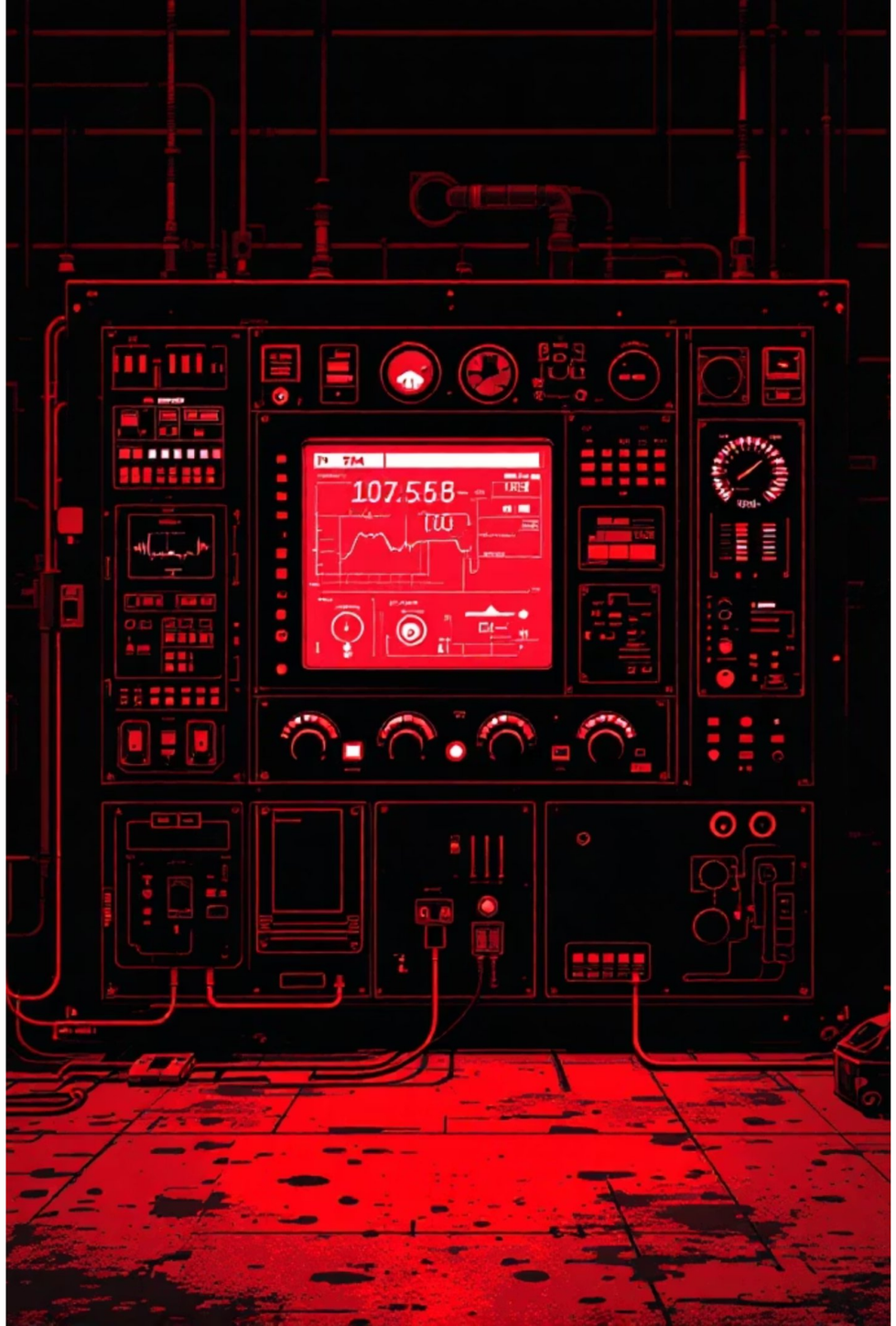
Operation & Maintenance of PSA Oxygen Plant Training Course

Organized by: Atulit Biswas Swasth Evam Shikshan Samiti — a technical training program for engineers, technicians, and hospital staff focused on safe, reliable operation and maintenance of PSA oxygen generation systems.



Course Objective

Operational Mastery

Complete understanding of PSA principle, plant start-up/shutdown, purity control (93% ±3%).

Technical Competence

Installation, commissioning, instrumentation, automation, and compressor systems.

Safety & Emergency

Leak prevention, high-pressure handling, fire/explosion precautions and emergency SOPs.

Maintenance & Troubleshooting

Planned maintenance, zeolite care, oil/moisture control, and breakdown response.

Target Participants & Duration

Who should attend

- ITI Electrical
- ITI Mechanical
- Hospital technical staff & biomedical engineers
- Maintenance technicians and plant supervisors

Course duration

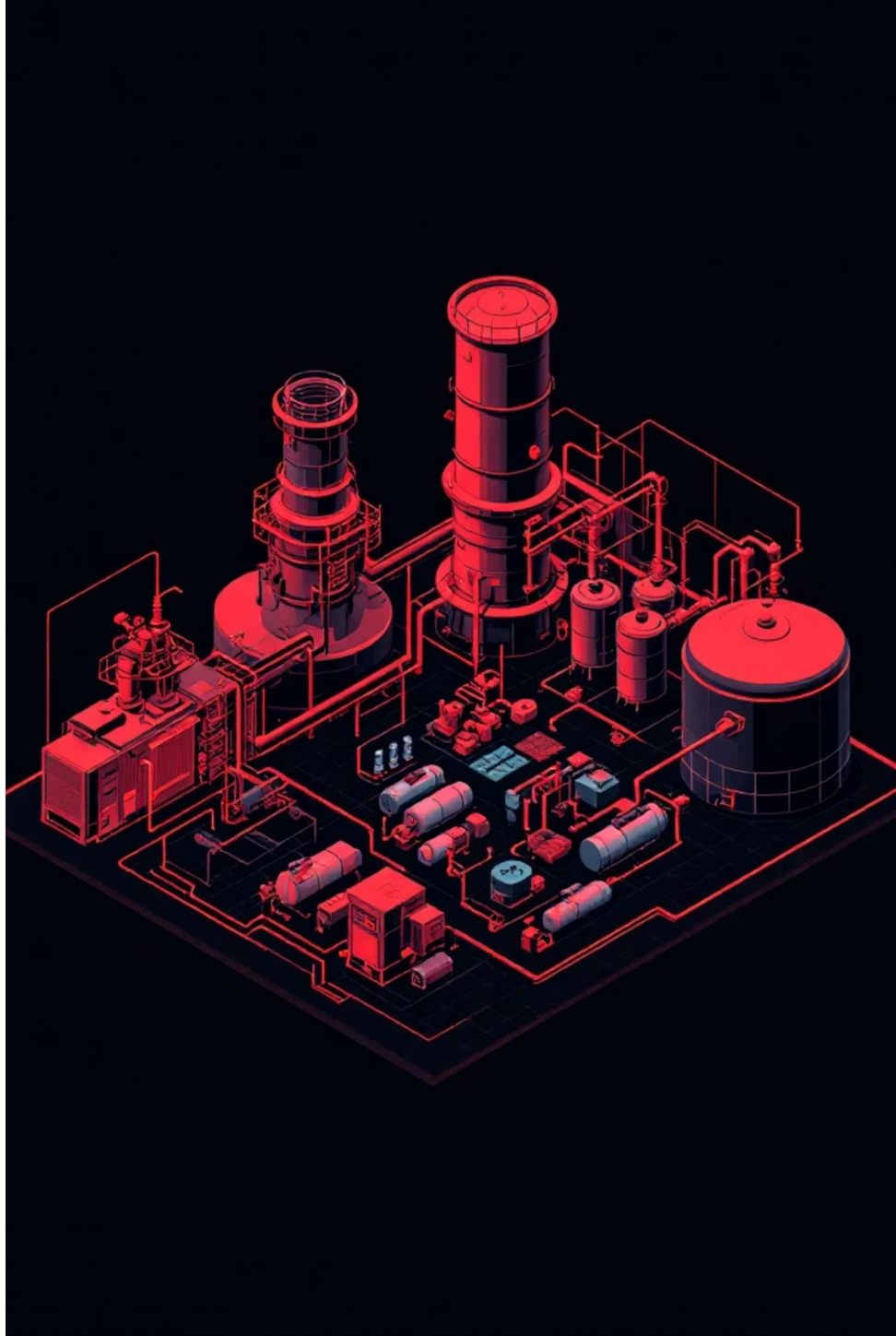
Basic Training – 20 days

Advanced Training – 10 days

Practical Course – 30 days

Total – 60 days

Training method: Theory + live practicals, case studies, video demos, hands-on installation and examination.



Module 1 — PSA Fundamentals & Plant Overview

Core topics: working principle of PSA, adsorption/desorption cycles, oxygen purification process, quality standards (93% ±3%), plant flow path and key instrumentation.

01

Adsorption

Compressed air passes through zeolite beds to adsorb nitrogen.

02

Desorption

Pressure reduction purges nitrogen; beds alternate to provide continuous O2.

Module 2 — Components & Their Functions

Air Compressor & Dryer

Deliver dry, oil-free compressed air at required pressure and dew point; critical for zeolite longevity.

PSA Towers / Zeolite Beds

Adsorb nitrogen; proper bed loading and replacement schedules are essential for consistent purity.

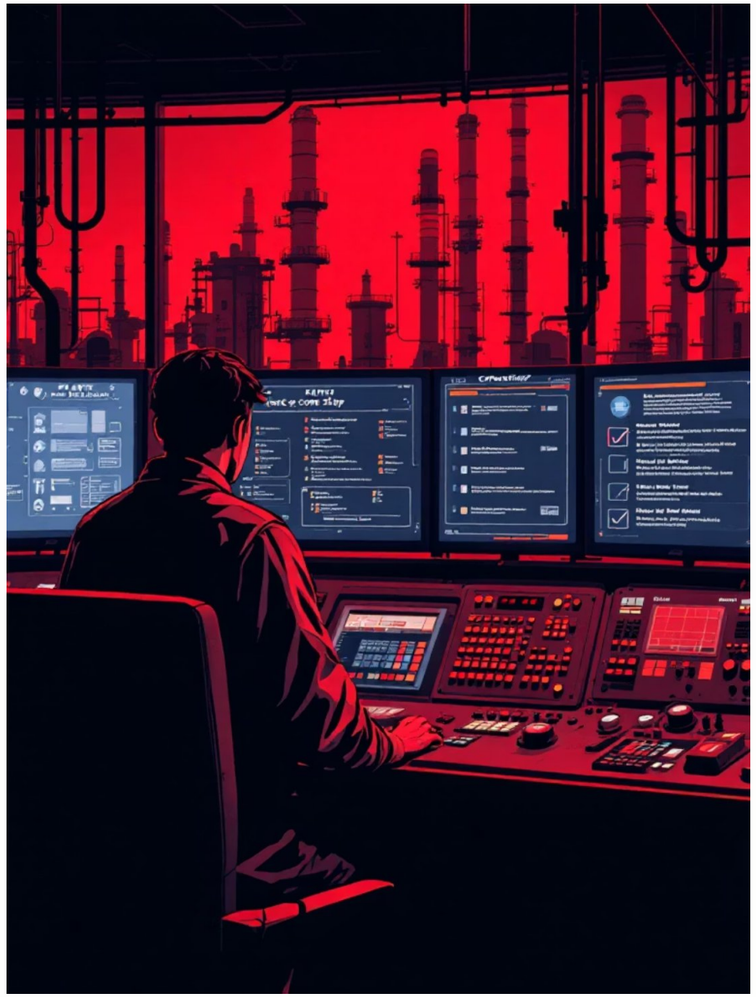
Oxygen Buffer Tank & Valves

Stabilizes delivery pressure and flow; valve sequencing protects product purity and pressure spikes.

Analyzers & Flow Meters

Real-time monitoring of O2 concentration, flow and alarms; calibration and validation procedures covered.

Module 3 — Operation: Procedures & Automation



- Start-up & shutdown SOPs: pre-start checks, compressor ramp, dryer purge, tower cycling.
- Flow, purity & pressure tuning: set-points, alarm thresholds, soft-start strategies.
- Manual vs Auto modes: switching logic, interlocks, fail-safe defaults.
- Control system overview: PLC logic, HMI screens, data logging best practices.

Emphasis on reproducible procedures to maintain 93% ±3% oxygen delivery under variable demand.

Module 4 — Maintenance & Troubleshooting

1

Routine Maintenance

Daily checks, weekly inspections, monthly servicing checklists for filters, dryers, valves and piping.

2

Zeolite Management

Signs of bed degradation, replacement intervals, handling and disposal precautions.

3

Oil & Moisture Control

Compressor lubrication audits, coalescing filter replacement, dew-point monitoring to prevent contamination.

4

Troubleshooting

Root-cause workflows for purity drops, pressure loss, flow instability, and interlock faults.

Module 5 — Safety, Emergency Management & Compliance

Topics: oxygen leak detection and mitigation, high-pressure safety, fire & explosion prevention, emergency shutdown SOP, logbook and performance record maintenance, regulatory compliance and documentation.

Risk Mitigation

Ventilation, leak monitoring, non-sparking tools, oxygen-compatible materials.

Emergency Response

Isolation procedures, rapid shutdown, notification protocols and evacuation considerations.

Records & Compliance

Maintain SOPs, calibration logs, incident reports and certification documents for audits.

Assessment, Facilities & Outcomes

Training Methodology

Theory sessions, live plant operation, hands-on servicing, case studies, video demonstrations and final examination.

Facilities After Completion

- Certificate of Completion
- Job search assistance and placement guidance
- Maintenance & safety checklist templates

Enrollment, Fees & Special Notes

Preference given to ITI Mechanical and ITI Electrical candidates. Training fee: ₹ 30,000/-. Practical installation modules require PPE and basic tool set. Limited seats — certificate awarded after successful assessment.

How to Apply

Contact Atulit Biswas Swasth Evam Shikshan Samiti for enrollment steps, payment options, and batch schedules.

Next Steps

Confirm prerequisites, submit candidate details, and prepare for pre-course orientation.